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BEFORE THE

Federal Communications Commission

WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
Amendment of Parts 2 and 25 of the Commission's Rules	)	ET Docket No. 98-206
To Permit Operation of NGSO FSS Systems Co-Frequency	)	RM-9147, RM-9245
With GSO and Terrestrial Systems in the Ku-Band	)	
Frequency Range and Amendment of the Commission's	)	
Rules to Authorize Subsidiary Terrestrial Use of the	)	
12.2-12.7 GHz Band by Direct Broadcast Satellite	)	
Licensees and Their Affiliates	)	

To: Chief, International Bureau
Chief, Office of Engineering and Technology

COMMENTS OF VIRTUAL GEOSATELLITE, LLC

Virtual Geosatellite, LLC ("Virtual Geo"), by its attorneys, hereby responds to the Commission's request[1] for additional comments in the instant proceeding on relevant issues that are identified in Chapter 3 of the Report of the International Telecommunication Union ("ITU") Conference Preparatory Meeting ("CPM") for the 2000 World Radiocommunication Conference ("WRC-2000") on Operational and Regulatory/Procedural Matters to be Considered by WRC-2000 ("CPM Report"). Chapter 3 of the CPM Report discusses issues relating to non-geostationary fixed-satellite service ("non-GSO FSS") systems that would operate on a co-frequency basis with geostationary FSS ("GSO FSS") and geostationary broadcasting satellite service ("GSO BSS") systems in certain bands between 10 and 30 GHz – including the 11/14 GHz "Ku-band" frequencies that are the subject of the instant proceeding.

[1] *See* Public Notice, DA 99-2733, *FCC seeks comment on NGSO FSS results from the Conference Preparatory Meeting on Technical, Operational and Regulatory/Procedural Matters to be Considered by the 2000 World Radiocommunication Conference* (released December 6, 1999) ("*Public Notice*").

I. INTRODUCTION AND STATEMENT OF INTEREST

As an applicant for a unique type of non-GSO FSS satellite system that would utilize Ku-band frequencies, Virtual Geo has a keen interest in the successful resolution of the sharing issues facing Ku-band satellite systems before the ITU and in the instant Commission rulemaking proceeding. In furtherance of this interest, Virtual Geo has been very active both in the U.S. and ITU processes that have been addressing these issues, and will continue to participate until all relevant issues have been resolved.

Virtual Geo's interest, however, has taken a somewhat different form than the other Ku-band non-GSO FSS system proponents, in that Virtual Geo's objective has been to provide GSO FSS and GSO BSS operators with the protection from co-frequency non-GSO FSS systems that they claim to require. Virtual Geo is able to take this highly unusual position because Virtual Geo's proposed "VIRGO" system, unlike most of the other non-GSO FSS systems that have been at the heart of the Ku-band GSO/non-GSO sharing issue over the last few years, operates in a manner that prevents active VIRGO satellites from coming within 40 degrees of the GSO arc. As a result, satellites in what Virtual Geo calls a "virtual geostationary satellite orbit" or VGSO are effectively transparent to co-frequency GSO systems, do not pose any sharing difficulties with regard to GSO systems, and allow the almost limitless reuse of invaluable spectrum resources.

In these comments, Virtual Geo addresses the compromise that was reached at last month's CPM on non-GSO FSS sharing with GSO FSS and GSO BSS systems. It also emphasizes that even if the compromise arrangements and associated text are duly and fully converted into approved regulations at WRC-2000, some of the most critical sharing issues involving Ku-band non-GSO FSS systems – particularly the issue of how non-GSO FSS systems share with each other, and the issue of how to ensure that the aggregate interference from four or more non-GSO FSS systems into an operational GSO FSS earth station will not exceed agreed levels – remain unresolved. As a general

proposition, both of these issues must be resolved before the Commission can license any non-GSO FSS system to operate in Ku-band. Virtual Geo also offers some suggestions as to how the Commission should reflect the CPM compromise arrangements in an initial report and order in the instant rulemaking proceeding. Finally, and most importantly, Virtual Geo identifies some of the broader public policy issues which should shape the Commission's rulemaking proceeding.

II. DISCUSSION

Chapter 3 of the CPM Report contains a recommended approach to Ku-band sharing between GSO FSS and GSO BSS systems on the one hand, and non-GSO FSS systems on the other. This is an important development, and one that culminates more than two years of intensive study and debate within and outside the ITU. The recommended approach consists of a package of validation limits (which would be verified as part of the publication/notification process by the Radiocommunication Bureau); operational limits to protect against synchronization losses in certain earth stations; a set of operational masks for 3 meter and 10 meter GSO FSS earth stations (referred to in the CPM Report as "additional operational limits"); and a second set of validation limits that would apply to for the protection of GSO earth stations located in the far northern and far southern regions of the world. According to the CPM, this package of proposals, each operating in conjunction with the other, would adequately protect the Ku-band GSO networks that are in existence or planned today from unacceptable interference caused by co-frequency non-GSO FSS networks.

Virtual Geo applauds the effort that went in to the development of this approach, and is pleased that the U.S. Ku-band GSO community has found itself able to agree to a sharing approach that it believes is acceptable. There is no question, however, that the arrangements contemplated in Chapter 3 of the CPM Report are complicated, and at this time, are only partially reflected in example regulatory text in the Annexes to Chapter 3, as well as in the developing set of U.S. proposals to WRC-2000. Much additional regulatory text needs to be developed by the U.S. and other interested

Administrations in a very short time, and Virtual Geo is of the firm view that the GSO/non-GSO sharing approach agreed at the CPM will not become a true, final agreement until the essential regulatory provisions identified in the CPM Report have been developed and, along with the provisions agreed by CPM, are formally adopted by WRC-2000.[2]

The nature of the compromise arrangement, with its reliance on "operational" and "additional operational" limits that would not be subject to verification by the ITU, places much of the burden of ensuring compliance with the regulations on individual Administrations. The ITU will be developing the technical tools and methodologies to help Administrations perform this task, but will not be doing the compliance work itself. *See* CPM Report at § 3.1.2.4.8. As the Commission takes on this responsibility in its resolution of the GSO/non-GSO sharing issues in the instant proceeding, Virtual Geo urges the Commission to remain mindful of the fact that not all non-GSO FSS systems are alike. Because the difficulty in arriving at a sharing regime stems from the fact that in-line events occur between GSO and circular-orbit non-GSO FSS systems (such as the one proposed by co-first-round applicant SkyBridge, LLC), rules designed to ensure that such events do not occur may be unnecessary for application to non-GSO FSS systems of the class proposed by Virtual Geo – which is designed never to come within 40 degrees of an in-line event with a GSO network. Nevertheless, given its continuing interest in protecting co-frequency GSO systems, Virtual Geo would support a Commission-developed rule that would require non-GSO FSS systems to demonstrate their ability to meet all of the agreed validation and operational limits prior to receipt of any authorization.

As laudable as the CPM compromise on Ku-band GSO/non-GSO sharing may be, it does not resolve several of the critical outstanding issues that face the ITU in this band. In particular, the CPM Report does not contain any resolution of the question of how Administrations will ensure that

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[2] In this last regard, the prospect always exists that Administrations that operate Ku-band GSO spacecraft but that were not part of the very small group of countries that was the most intensely involved in the development of Chapter 3 over the last two years, may show up at WRC-2000 with different protection requirements and an entitlement to be heard. The Commission must bear this prospect firmly in mind as it moves forward both in preparations for WRC-2000 and with the instant rulemaking proceeding.

the aggregate interference levels from multiple non-GSO FSS systems do not exceed the overall protection criteria that have been identified for co-frequency GSO systems. In a related vein, the CPM Report does not resolve the fundamental sharing issues that exist between non-GSO FSS systems, and notes that particular difficulties are to be expected when inhomogeneous non-GSO FSS systems seek to operate on a co-frequency basis. *See* CPM Report at Section 3.1.1.1(b). These issues will not be resolved within the ITU until after WRC-2000 at the earliest.

From Virtual Geo's perspective, the unresolved issues on non-GSO FSS sharing with other non-GSO FSS systems are the most critical. Because of the unique design of its VIRGO system, Virtual Geo has been able from the outset to endorse all of the protection requirements stated by U.S. GSO systems, as even the most stringent of them could be readily satisfied. Now that the U.S. has agreed to an approach whereby WRC-2000 could adopt acceptable protection levels for GSO systems, attention necessarily turns to the means to ensure co-frequency operation of multiple non-GSO FSS systems at Ku-band. Internationally, the only mechanism put into place by WRC-97 (in Resolution 130) was the first-come, first-served coordination device now incorporated in ITU Radio Regulation S9.11A. *See* Resolution 130 (WRC-97), at Resolves 8.

Although Section 3.1.1 of the CPM Report addresses some preliminary activities on non-GSO/non-GSO sharing that were undertaken in the ITU over the last two years, no meaningful conclusions on this critical subject were reached.[3] The Commission has before it eight mutually exclusive applications for authority to establish Ku-band non-GSO FSS systems, all of which have equal rights at this point to become authorized as U.S. systems and to serve the United States market. A first-come, first-served regime therefore does not apply domestically. Clearly, then, the

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[3] In Section 3.1.1.1(c) of the CPM Report, it is specifically noted that "[n]o conclusions were reached regarding sharing between high-altitude non-GSOs . . . and lower altitude non-GSOs, such as LEOs and MEOs." CPM Report at § 3.1.1.1(c).

Commission will have to develop a means of resolving the mutual exclusivity in its domestic processes.

Virtual Geo has maintained that if all systems are required to use the VGSO type of non-GSO orbits that Virtual Geo has proposed in its VIRGO application and in its comments on the notice of proposed rule making in the instant proceeding earlier this year, all eight applicants could be accommodated without negatively impacting either GSO or terrestrial services.[4] The Commission has yet to act on this issue, and informal discussions among the applicants for the eight first-round Ku-band non-GSO FSS systems to converge on a possible assignment plan are only in the very early stages.

To the extent that the Commission finds itself able to issue a decision in the instant proceeding prior to WRC-2000, Virtual Geo urges that any such decision be limited to the GSO/non-GSO FSS sharing arrangements that were the subject of the compromise agreement reached at the CPM. The non-GSO/non-GSO sharing issues with which Virtual Geo is most concerned at this point are simply not ripe for decision based on the results of the CPM, and would therefore become the subject of a second report and order in this proceeding. The Commission should also make clear, in any decision it issues on the GSO sharing issue, that capacity and operational constraints that certain types of non-GSO FSS systems have to accept in order to enable their designs to share with GSO systems cannot be raised as arguments against the possible imposition of additional constraints that may be required in order to enable sharing to occur with co-frequency non-GSO FSS systems. Any other decision would unfairly prejudice those non-GSO FSS systems, such as Virtual Geo's VIRGO system, that accepted the burden of protecting GSO systems as their primary design constraint, duly incorporated that burden in their design, and optimized their orbital characteristics accordingly.

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[4] *See* Comments of Virtual Geosatellite LLC, ET Docket No. 98-206.

In this last regard, Virtual Geo recognizes that the prematurity of Commission action on the non-GSO/non-GSO sharing issues necessarily means that any action to authorize non-GSO FSS systems to serve the United States at Ku-band must be withheld for the time being. Until further work is done within the ITU, or until an assignment plan is achieved by the U.S. non-GSO FSS applicants themselves, the applications remain mutually exclusive, and none can be allowed to proceed.

As a final matter, Virtual Geo takes this opportunity to recall to the Commission the very major public policy issues inherent in any decisions on non-GSO sharing – public policy issues with both national and global implications. The rampant growth of the Internet, accompanied by ever greater demands for high speed access are the subject of growing public discussion, accompanied by policy debates at the highest levels of the public and private sectors. Indeed, it is hard to identify any phenomenon comparable to Internet in terms of speed of development, universal impact on almost all aspects of economic, social and political life, and implications for the future strength and competitiveness of major segments of populations and of entire countries. Today, it is common to speak of Internet "haves" and "have nots" and the implications thereof for the future.

Perhaps the central, essential requirement for the continued expansion of the Internet and of information technology generally is the existence of sufficient spectrum resources. From the standpoint of wireless technology, without adequate spectrum, large segments of the world's population, including many in the United States, will be denied access to the kinds of information technology and the Internet that are proving to be such powerful vehicles of economic growth. In Virtual Geo's view, accordingly, perhaps the single most important test to be applied in the present Ku-band rulemaking proceeding is whether a system expands or limits the reuse of existing spectrum. Systems such as the low-Earth circular-orbit non-GSO systems can only share Ku-band spectrum if a limited number of systems are authorized, therefore artificially limiting the use of spectrum resources

to those few and limiting the capacity and new technologies and services which are characteristic of an open, competitive marketplace. These inefficient uses should be discouraged. In contrast, a very large number of non-GSO systems utilizing VGSO orbits can coexist without interfering with one another, with existing GSO systems and with the fixed terrestrial services. Clearly, the Commission should encourage this concept, which amounts to an entirely new global resource, by every appropriate regulatory means.

III. CONCLUSION

Virtual Geo applauds the achievements at Ku-band that are reported in Chapter 3 of the CPM Report. Once these arrangements and the additional points noted by Virtual Geo above are appropriately addressed in the Commission's forthcoming initial report and order in this proceeding, the Commission should expeditiously begin work on a second report and order that addresses the outstanding issues relating to non-GSO/non-GSO sharing.

Virtual Geo looks forward to having the opportunity to continue to participate in the development of U.S. proposals to WRC-2000 on Ku-band sharing issues, and to helping the United States achieve a favorable outcome at WRC-2000 next May.

Respectfully submitted,

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December 20, 1999

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CERTIFICATE OF SERVICE

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